

REMARKS

Claim 3 is pending in the present application. In light of the Office Action mailed June 9, 2005 claim 3 stands rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 10/280,974, Publication No. 2004/0082094 ("Yamamoto"). The applicant respectfully disagrees with this rejection.

Claim 3 of the present application is directed toward a method that includes forming a plurality of image sensor die having micro-lenses onto a semiconductor wafer. The image sensor die uses a ball grid array (BGA) on the underside of the die. The method further includes forming a protective layer over said image sensor die, dicing the wafer to separate the plurality of image sensor die, and mounting the image sensor die onto an integrated circuit package. The method still further includes removing the protective layer from the image sensor die.

The Examiner maintains that Yamamoto teaches all of the features of claim 3. For example, the Examiner maintains that paragraph 29 of Yamamoto, which discusses Figure 5, inherently teaches "using a ball grid array on the underside of the image sensor die, because contact pads in *Yamamoto* are BGA of the package so the image sensor die is conductively coupled to the package." The undersigned disagrees because the contact pads in Figure 5 of Yamamoto are positioned on top of the die and are not BGA contacts.

The Examiner has failed to support the premise that paragraph 29 and Figure 5 of Yamamoto inherently teaches an image sensor die that uses a ball grid array (BGA) on the underside of the die, as recited in pending claim 3. As discussed and shown in the present application, a BGA arrangement allows contacts on the die to be electrically connected to contacts on the integrated circuit package without the need to expose any of the top surface of the image sensor wafer or the need for bonding wires (para. 19; Figures 2-5). As admitted by the Examiner in his February 1, 2005, Office Action, "*Yamamoto* is silent about using a BGA (ball grid array) on the underside of the image sensor die." Additionally, unlike BGA contacts which are located on the bottom of a die, the contact

pads referenced by the Examiner in paragraph 29 and Figure 5 of Yamamoto are exposed on top of the die next to the pixels and the protective layer covering the pixels. Furthermore, unlike a BGA arrangement, the contact pads referenced by the Examiner in Yamamoto are configured to be connected to pins of an IC package via bonding wires (para. 29-33; Figure 6). Accordingly, the Examiner has failed to point to any portion of the Yamamoto reference to support the assertion that the contact pads discussed in paragraph 29 of Yamamoto are BGA contacts or that Yamamoto inherently teaches a BGA arrangement.

Additionally, the specific contact pads referenced by the Examiner in paragraph 29 and Figure 5 of Yamamoto cannot be BGA contacts on the underside of the die as suggested by the Examiner. If the contact pads and the pixels shown in Figure 5 are positioned on the underside of the die, in a BGA arrangement the die would be connected to the IC package with the pixels pointing toward the IC package. This arrangement would interfere with the operation of the Yamamoto device because the IC package would block light from entering the pixels. Additionally, if the contact pads and pixels in Figure 5 are on the underside of the die, it would appear that the pixels and/or the protective coating would interfere with the contact pads on the die connecting to contacts on an IC package in a BGA arrangement because the pixels and protective covering extend beyond the contact pads. Accordingly, the specific contact pads shown in Figure 5 of Yamamoto are not BGA contacts on the underside of the die and the Examiner has not pointed to any portion of the Yamamoto reference to support the assertion that the contact pads discussed in paragraph 29 of Yamamoto are BGA contacts or that Yamamoto inherently teach a BGA arrangement.

For at least these reasons, claim 3 is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 50-0665, under Order No. 384938073US from which the undersigned is authorized to draw.

Dated:

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Respectfully submitted,

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